

# $J/\psi$ Production and Suppression in Nuclear Collisions

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## Abstract

We show that the color evaporation model and NRQCD model for calculating the hadronic  $J/\psi$  production correspond to two very different approximations of a newly proved QCD factorization formula for quarkonium production; and these two production models lead to different suppression mechanisms of  $J/\psi$  in nuclear medium. Using the new QCD factorization formula for  $J/\psi$  production, and including the multiple scattering between the pre- $J/\psi$  partonic states and the nuclear medium, we calculated the  $J/\psi$  suppression in nuclear collisions. We find that all observed data on  $J/\psi$  suppression in PA and AA collisions, except the five points (the "second drop") at the highest  $E_T$  bins of the new NA50 data, are consistent with our calculation.

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